

MISSOURI CONSERVATIONIST

VOLUME 86, ISSUE 9, SEPTEMBER 2025
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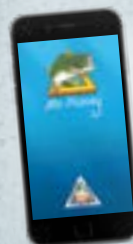
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ON THE COVER

A buck stands tall at dusk among
Leoss Bluffs National Wildlife Refuge.

DAVID STONNER

EF500mm lens, f/4
1/4000 sec, ISO 400

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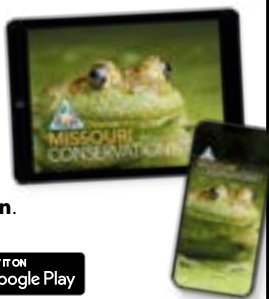
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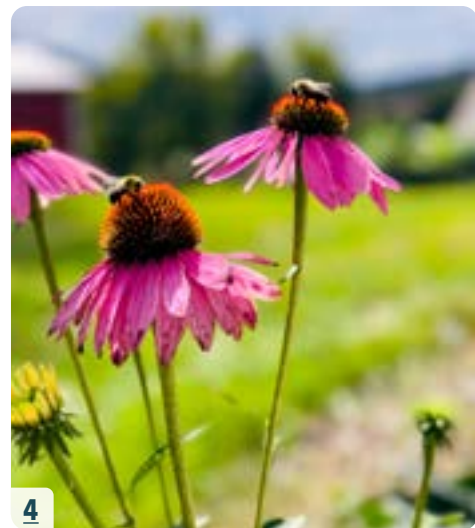
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Inbox



Want to see your photos in the *Missouri Conservationist*?

Submit your photos online via [flickr.com/groups/mdcreaderphotos-2025/](https://www.flickr.com/groups/mdcreaderphotos-2025/), mdc.mo.gov/magazine-reader-photos or by emailing readerphoto@mdc.mo.gov

1 | Blue dasher dragonfly by **Briony Beeching**, via email

2 | American goldfinch by **Rick Wilhoit**, via flickr

3 | Gray squirrel with sunflower by **Dan Peak**, via flickr

4 | Bees on coneflowers by **Ethan James Zoellner**, via web submission

➔ In the December issue we plan to feature even more great reader photos. Send in your best year-round pictures of native Missouri wildlife, flora, natural scenery, and friends and family engaged in outdoor activities. Please include where the photo was taken and what it depicts.



Letters to the Editor

Submissions reflect readers' opinions and may be edited for length and clarity. Email Magazine@mdc.mo.gov or write to:
MISSOURI CONSERVATIONIST
PO BOX 180
JEFFERSON CITY, MO 65102



A LITTLE APPRECIATION

Just wanted you to know how much the paper versions of your magazines are appreciated. Our grandson loves them all!
Don and Lynn Minx Farmington

FROM CALIFORNIA WITH LOVE

Although I was born and raised in Franklin County, I am now just a part-time resident of Missouri. While I'm back home in New Haven, I get to collect my siblings' saved *Missouri Conservationist* magazines, which I treasure and haul back to California with me. The magazines have helped me love my home state even more than when I was growing up.

I cannot wait until my husband retires so we can (hopefully) make Missouri our permanent residence. Until that time comes, the magazines keep me connected and educated and now I have great plans for retirement. Not to mention, I am no longer afraid to explore our woodsy backyard property, thanks to what I have learned through your magazine. Much heartfelt thanks to the whole department.

Patti Mazon New Haven

Up Front



✱ Over 90 percent of Missouri is in private ownership, which means the majority of Missouri's conservation success stories have a significant connection to those who have cared for and worked the land. The role of landowners in the future of fish, forest, and wildlife is a hallmark of Missouri's modern conservation movement, which started 90 years ago this month.

September 10, 1935, was one of the most significant days in the history of the state of Missouri. Nearly 100 individuals gathered at the Tiger Hotel in Columbia to form the Conservation Federation of Missouri, which led the initiative petition, with citizen support, that created the conservation commission we know today. The direction of conservation in Missouri was determined by several of the initial decisions made by the first commission. One of those decisions was hiring I.T. Bode as the first director.

Director Bode understood the connections between the success of conservation and the actions of landowners. He brought a landowner-focused approach to much of the early work of the Department of Conservation. Having grown up on and around many cattle and row crop farmers, spending countless hours hunting and fishing on private lands, I, too, have great appreciation for the role of landowners in the continued success of fish, forest, and wildlife in Missouri.

The department remains committed to working closely with landowners because when the land is healthy and our wildlife is thriving, so do those of us fortunate enough to live in this great state.

JASON SUMNERS, DIRECTOR
JASON.SUMNERS@MDC.MO.GOV

Our Mission

The Missouri Department of Conservation protects and manages the fish, forest, and wildlife of the state. We facilitate and provide opportunity for all citizens to use, enjoy, and learn about these resources.



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Have a Question for a Commissioner?

Send a note using our online contact form at mdc.mo.gov/commissioners.

Connect With Us!



WILDLIFE MANAGEMENT

Conserving Birds Beyond Our Borders

To manage for migratory birds, partnerships are essential

by Dianne Van Dien

✳ About 50 percent of birds that breed in our state leave during the nonbreeding season. Of these, more than half exit the U.S. entirely. Some are in Missouri for only four or five months each year.

“So, even if the best, most pristine habitat in Missouri were possible,” says State Ornithologist Kristen Heath-Acre, “we’d still be looking at only half the picture for these birds.”

To thrive, migratory birds need healthy habitat not only during the breeding season but also on their migration routes and wintering grounds. Managing the habitats birds use throughout the year is called full life-cycle conservation. But how can state agencies like MDC put this into practice for birds that go to other countries?

In 2009, working with the Association of Fish and Wildlife Agencies, former State Ornithologist Brad Jacobs spearheaded a program called Southern Wings to address this issue. Like Fall Flights, which works with groups in the U.S. and Canada to

Because the wood thrush breeds in North American forests and winters in southern Mexico and Central America, effective conservation requires management for healthy habitat in both locations and areas in between.

improve waterfowl habitat, Southern Wings partners states with conservation nonprofits in Latin American countries where their breeding birds migrate. Today, more than 40 other state agencies participate.

Through this program, Heath-Acre explains, we “help support things like native tree plantings, bird research, and education and outreach focused on bird-friendly agriculture practices like shade-grown coffee.”

But these partnerships are not just financial.

“We support them in other ways,” says Heath-Acre. “We share data, give feedback on research, things like that.”

Southern Wings matches each state agency with groups in locations that most strongly connect to birds that breed in their state. The Motus Wildlife Tracking System, which also depends on partnerships and data sharing, has helped scientists gain these migration details.

“We’ve tagged birds like cerulean warblers, wood thrush, and golden-winged warblers, and through Motus we now know more specifically where these and other Missouri birds go in winter,” Heath-Acre explains. “So we know the resources we’re sending will directly impact and benefit our migratory species.”

Learn more about Motus at short.mdc.mo.gov/4FQ.

Wood Thrush *Hylocichla mustelina*

Abundance Map eBird Status and Trends



For details on the Abundance Map, visit short.mdc.mo.gov/4t7 or scan the QR code.



Cornell eBird



At a Glance

PRAIRIE WARBLER: migrates to Gulf Coast, Florida, and Caribbean

CHIMNEY SWIFT: migrates to Mexico, Central America, and Colombia

CERULEAN WARBLER: migrates to Colombia, Venezuela, Ecuador, and Peru

YELLOW-BILLED CUCKOO: migrates as far as Argentina

Missouri birds by the numbers:

About 335 species occur regularly in MO.

- 170 breed in MO
- 84 of these leave MO during nonbreeding season
- 58 of these 84 leave the U.S.

To practice full life-cycle conservation for migratory birds, MDC partners with conservation groups in other countries through a program called Southern Wings. This program helps state agencies aid habitat conservation in places where their breeding birds migrate and overwinter.

MDC ANNOUNCES NEW COMMISSIONER

GOV. MIKE KEHOE APPOINTS CENTERTOWN
MAN TO SERVE ON COMMISSION



➔ MDC and the Missouri Conservation Commission welcome Edward C. Clausen of Centertown to the Missouri Conservation Commission following his recent appointment by Gov. Mike Kehoe and pending confirmation by the Missouri Senate.

"We're excited to have Ed's professional experience and personal passion for conservation on the commission," said MDC Director Jason Sumners. "He knows how important the outdoors are to our quality of life in Missouri, including managing private land for wildlife and outdoor recreation opportunities on public lands."

Clausen is a partner at Newman, Comley, and Ruth P.C., a law firm specializing in defending medical malpractice claims. He is an active member of several organizations, including the Conservation Federation of Missouri, the Association of Defense Trial Attorneys, and Sigma Phi Epsilon fraternity. He previously served on the board of directors for the Friends of the Eleven Point River. Clausen earned his Juris Doctor from the University of Missouri School of Law.

He lives in Centertown with his wife, Debby, and their land adjoins the Roger V. and Viola Wachal Smith Conservation Area.

"I'm humbled and honored to be appointed as a conservation commissioner," Clausen said. "Ours is the premier conservation department in the nation and I'm

grateful to the people of Missouri for supporting such a bounty of nature-focused public land for everyone to enjoy."

He added that the hunting, fishing, floating, hiking, wildlife-watching, and other outdoor opportunities in Missouri are amazing.

"I've been to many, many conservation areas around the state, and our family did a lot of floating, camping, fishing, and hunting when our three kids were little," he said. "We still enjoy floating Missouri streams and other outdoor activities with them as adults — and also now with our grandson, Hudson."

Clausen and his family also have a history of managing their land for wildlife. They recently cleared cedar trees that were invading several acres along the road and then planted wildflowers. He added that they've also done timber-stand improvements over the years and maintain trails on their property.

His ties to nature go back to his childhood and he has shared them with his kids.

"My dad informally showed me how to hunt when I was a kid, but some of the most valuable outdoor learning for me was through MDC's Hunter Education program," Clausen explained. "I took the class with my oldest son when he started to hunt decades ago, and it was incredibly helpful."

Commissioner Clausen was appointed for a six-year term that will expire in 2031. He

replaces outgoing commissioner Mark McHenry of Kansas City, whose term expired July 1. Clausen joins Commissioners Margaret F. (Margy) Eckelkamp of Washington, Raymond T. (Ray) Wagner Jr. of Town and Country in St. Louis County, and Steven D. Harrison of Rolla.

"I also look forward to helping our next generations of conservationists," Clausen added. "To paraphrase an old quote, 'Wise are those who plant trees under which they will never sit.' This future focus applies to fisheries and wildlife conservation, as well."

The Missouri Conservation Commission consists of four members appointed by the governor with the advice and consent of the Senate. Commissioners serve six-year terms with no salary or other compensation with not more than two allowed from the same political party. Their responsibilities include appointing the MDC director, serving as MDC policy makers, approving regulations of the *Wildlife Code of Missouri*, strategic planning, and budget development and major expenditure decisions.

Ask MDC

Got a Question for Ask MDC?

Send it to AskMDC@mdc.mo.gov
or call 573-522-4115, ext. 3848.

Q: Is this just a standard hoverfly or something else? I found it in my native wildflower garden last September in St. Louis.

➔ This is likely a northern plushback fly (*Palpada vinetorum*), which is in the hoverfly family (Syrphidae). The horizontal stripes on the abdomen, the dense golden hairs, and the strong whitish-gray bands on the thorax are characteristic.

These robust, beelike flies consume nectar, which means they are frequently found on flowers. They like to crawl into the inner whorl of a flower. Their dense fuzz is efficient at collecting pollen, making them important pollinators. You can even see the pollen grains caught in the hairs of the fly pictured here.

This fly will visit almost any flower with available nectar.



Northern plushback fly

Q: I was out walking at dusk a couple of nights ago, and I spotted two fawns and a doe. I watched them from about 10 feet away and noticed something about the fawns. They were both small, but one had spots and the other didn't. Why are they different?

➔ As they transition from summer to winter fur, white-tailed fawns typically lose their white spots completely during their first molt at three to four months, thus acquiring a gray uniform coloration.

Most, but not all, fawns are born in late May or early June. It's likely the fawn on the left was born earlier than the fawn on the right. Born earlier, it has also molted earlier — which is why it has a grayish color. The fawn on the right is likely to be slightly younger and so had not started the molting



White-tailed deer fawns

process yet. Missouri's white-tailed deer shed their hair twice a year. Each fall they replace their summer coat (shorter, reddish hair) with their winter coat (longer, gray hair).

Q: I have a huge persimmon tree in the yard, and every fall something starts chewing small twigs that drop all over the yard. What could be doing this?

➔ When you see this damage in the fall, twig girdlers — a species of long-horned beetle (*Oncideres cingulata*) — are a likely explanation.

Damage caused by twig girdlers is very common in the fall, as female beetles are actively



Twig girdler

laying eggs in host trees. First, female beetles chew a concentric circle around the twig, cutting off the flow of water. The female then chews egg sites and lays eggs in the portion of the twig beyond the girdling cut. The branch may remain attached to the tree (with brown, flagging leaves) or it may break away and fall due to wind or its own weight. The cut made by the female twig girdler results in twigs with

smooth edges and a ragged center.

Twig girdler damage is typically not significant on mature trees. Homeowners may be able to reduce local numbers of twig girdlers by removing and destroying fallen twigs, beginning in September or no later than May.

More information on twig girdlers and pruners is available on the University of Missouri Extension website at short.mdc.mo.gov/4td.

What IS it?

Can you guess this month's natural wonder?

The answer is on Page 9.



Kelsey Gillenwater

BUCHANAN COUNTY
CONSERVATION AGENT

offers this month's

AGENT ADVICE

If the hot summer months kept you indoors, fall is a great time to reconnect with nature. And conservation areas are a great place to start. With more than 1,000 areas located statewide, you can find one just about anywhere. Plan a hiking trip and take in the scenery. Conservation areas are alive with color this time of year. The leaves of trees, shrubs, and vines will begin transforming into their fall palette. The areas are abuzz with activity as migrating birds, like blue-winged teal, make their appearance. And monarchs flutter around our native wildflowers, like goldenrods, as they make their migration south. Step onto one of our areas and let time slow down as you take it all in. To find an area, visit short.mdc.mo.gov/Z9o.

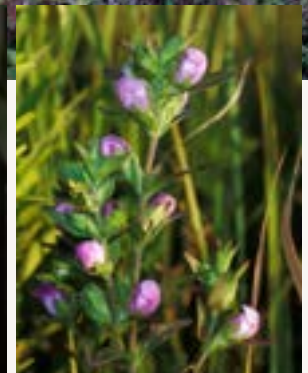


SPECIES OF CONSERVATION CONCERN

Auriculate False Foxglove

by Jessica Gibbs

Auriculate false foxglove (*Agalinis auriculata*) is scattered throughout Missouri, but it is mostly found in the northern and western parts of the state in prairies, glades, savannas, and sometimes in old fields. Because the leaves are much wider than other false foxglove species in Missouri, it is very easy to identify even before it flowers. The pink flowers are about an inch long and widely spaced down the hairy stem. These blooms appear in August to September, especially in areas that have had a recent disturbance like haying or burning. Unlike some other false foxglove species, this one does not turn black after it has dried.



WHY IT'S IMPERILED

Auriculate false foxglove's native habitats are vulnerable to agriculture, urbanization, and invasive species. Lack of periodic burning or haying in these areas also leads to this species becoming crowded out by more competitive forbs and grasses.

MDC RESTORATION EFFORTS

Efforts to maintain or restore populations of this rare species include management of both prairie remnants and prairie restorations. MDC also works with partners that manage and own prairie remnants or are working on prairie restoration projects on both public and private land.

WHAT CAN YOU DO?

If you are visiting a prairie, glade, or savanna in Missouri and see auriculate false foxglove, contact Malissa Briggler, the department's wildlife diversity coordinator, at Malissa.Briggler@mdc.mo.gov. Your help can provide valuable information needed to determine the status of this rare species in our state.

MANAGED WATERFOWL HUNTS

Reservations are required to guarantee an opportunity to hunt on MDC's 14 intensively managed wetland conservation areas. There are two ways to obtain a managed waterfowl hunt reservation online. The pre-season reservation period will run Sept. 1-18. Hunters may apply for pre-season reservations at up to three managed waterfowl hunting areas. In-season weekly drawings will take place on Monday afternoons starting in mid-October with a seven-day application period that opens the Tuesday before and closes the Monday of the drawing at 3 p.m.

Pre-season and in-season waterfowl hunting reservations together will comprise 50 percent of daily hunting positions. Of the 50 percent of positions going to reservation holders, half will be from pre-season applications and half from in-season applications.

The remaining 50 percent of spots will go to hunters who do not have reservations but who participate in the daily morning drawing, called the "poor line." For example, if an area has 20 hunting spots, 10 will be allocated through the poor line, five through pre-season reservations, and five through in-season reservations.

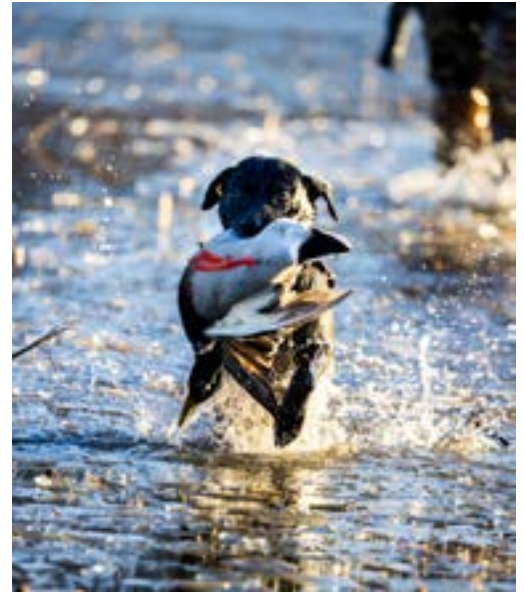
Only Missouri residents and qualifying non-residents, such as students from out of state

attending a school in Missouri or members of the military stationed in Missouri, can apply online for a reservation to guarantee them an opportunity to hunt on a specific day on a specific area. Residents and nonresidents can arrive at a managed waterfowl hunting area the morning they wish to hunt and wait in line for the possibility of getting a hunting spot. Residents and nonresidents can also hunt with a reservation holder. Hunting parties are limited to a maximum of four people.

Applicants for waterfowl reservations must have their required permits to apply, and their Federal Duck Stamp to hunt.

Successful pre-season and in-season reservation applicants will be notified after their respective drawings via email or text message with their hunt date, area, and pill assignment. "Pills" designate the order hunting parties select their hunting location on the area. The lower the number, the sooner hunting parties get to select their hunting location.

Hunters with disabilities can apply to use ADA hunting blinds through the online reservation system during the same timeframe as the pre-season application period. ADA



blinds that are not allocated during the pre-season drawing will be placed in the weekly in-season draws.

In addition to managed waterfowl hunts offered by MDC, waterfowl hunting opportunities can be found on other conservation areas, as well as Missouri's rivers, streams, and reservoirs.

WHAT IS IT? NORTHERN BOBWHITE

Northern bobwhites are ground-dwelling quails that are reddish-brown and white. They have distinctive brown caps, but the males' caps are darker. Named Missouri's official state game bird in 2007, northern bobwhites are still fairly common. However, populations have been declining due to habitat loss and unfavorable weather during winter and nesting season. MDC is helping to reverse the downward trend through several initiatives including public education, recreation opportunities, and landowner assistance.



SITTING ON A PUMPKIN

AUTUMN OFFERS A FRONT-ROW SEAT TO NATURE'S BEAUTY

.....

*I would rather sit on a pumpkin,
and have it all to myself, than be
crowded on a velvet cushion.*

— HENRY DAVID THOREAU

White-tailed deer

Noppadol Paothong

100-400 mm lens 1/12500 sec f/8

Monarch butterfly on sunflowers

David Stonner | 400 mm lens | 1/640 sec | f/5.6



Cecropia moth

Noppadol Paothong | 105 mm lens | 1/60 sec | f/11

There's something about autumn that calls us outside like no other season.

The leaves atop the trees are all in a sea of change, coming together to form one beautiful masterpiece. The crisp, cool air makes any activity — hiking, hunting, fishing, birdwatching, hammocking — downright pleasant. The animals in flight or scurrying along the ground are all abuzz, preparing for the next season to come.

It's a season alive with activity, yet somehow quite calming and serene all at once. And the best part about it is no matter where you are, you have a front row seat to all of it. So, pull up a chair, a hay bale, or even a pumpkin, and take it all in.



Red maple leaves

David Stonner

24-70 mm lens | 1/800 sec | f/6.3

Yellow maple leaves

David Stonner

24-70 mm lens | 1/160 sec | f/4

Maple tree

David Stonner

24 mm lens | 1/200 sec | f/4

Henning Conservation Area panorama

David Stonner

100-400 mm lens | 1/800 sec | f/5





Yellow-rumped warbler

Noppadol Paothong

600 mm lens | 1/60 sec | f/8



Frost's bolete mushroom

David Stonner

600 mm lens | 1/800 sec | f/8

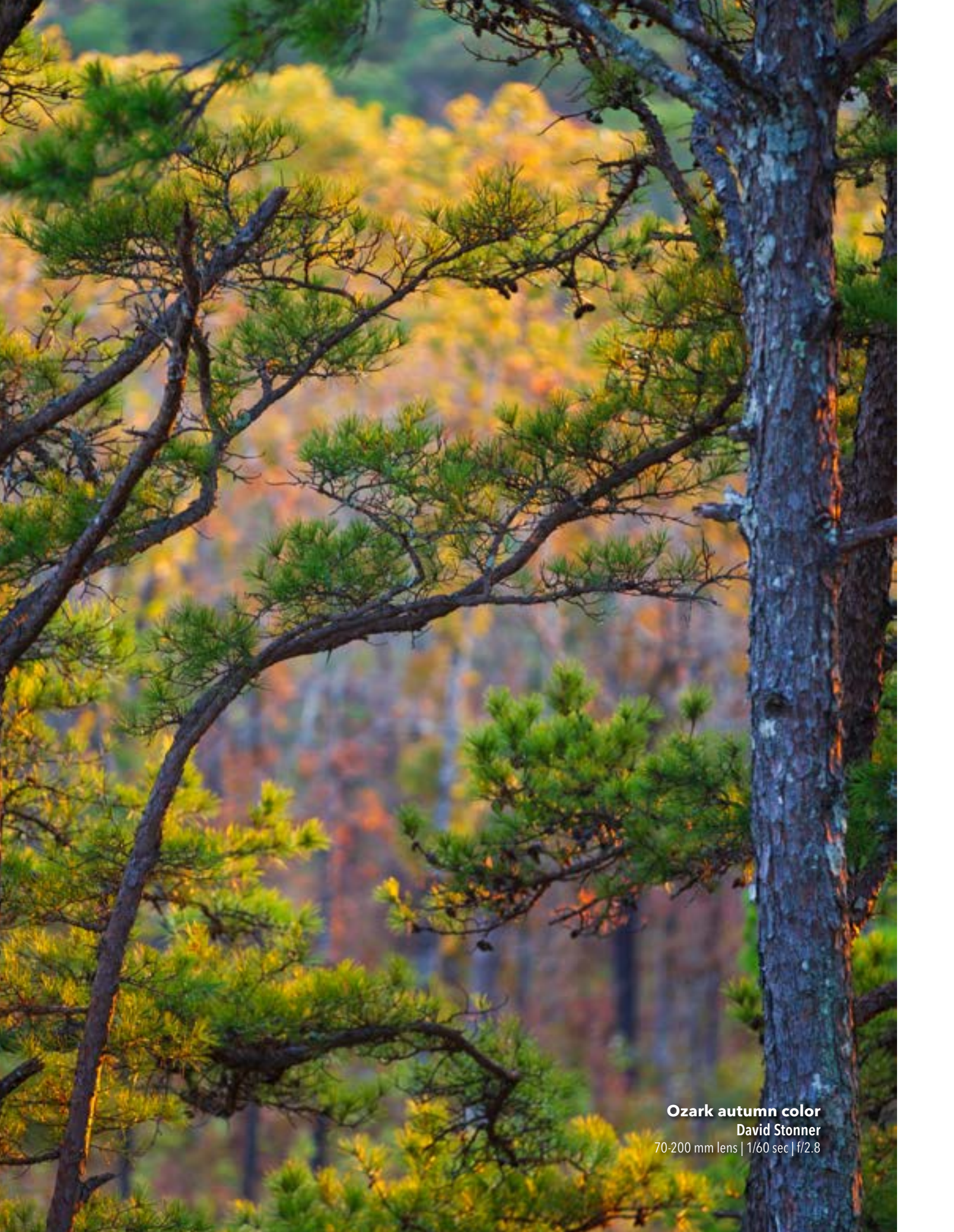


**Trumpeter swans at Loess Bluffs
National Wildlife Refuge**

David Stonner

500 mm lens | 1/2500 sec | f/5.6





Ozark autumn color

David Stonner

70-200 mm lens | 1/60 sec | f/2.8



Autumn dogwood leaves

Noppadol Paothong 70-200 mm lens | 1/60 sec | f/2.8



Wetland sunset at Grand Pass Conservation Area

David Stonner 100-500 mm lens | 1/125 sec | f/4.5



Red-winged blackbird

Noppadol Paothong 600 mm lens | 1/1000 sec | f/10

Duck hunters

David Stonner

400 mm lens | 1/2000 sec | f/5.6



Dove hunting

David Stonner

70-200 mm lens | 1/125 sec | f/4.5



Duck hunt at Fountain Grove Conservation Area

David Stonner

100-400 mm lens

1/400 sec | f/5.6



LEARNING FROM THE HARVEST

MAYSVILLE TEACHERS BRING LESSONS
FROM THE FIELD INTO THE CLASSROOM



PHOTOGRAPHS AND ARTICLE BY KATIE CURRID

As a group of high school freshmen gather around a freshly harvested doe in a metal shop building, Sophia Redman takes a knife into her hand, and with a determined look on her face, makes the first cut, surprised at the strength needed to slice into the flesh. Her classmates gather close, a mixture of interest and disgust, as their teacher, Brandi Ellis, points out the anatomical structure of the deer's muscles.

"There are a lot of kids that that's their first time holding a knife and cutting something like that and they get nervous," Ellis says. "I've had kids be almost shaky, but I make every single kid cut some part of it. And I think that's good for them because it forces them out of their comfort zone a little bit. And I tell them, I'll stand right beside them and say, 'Just cut right along this line.' And then once they do it, they can see how the muscles all laid together, and they can understand what I mean by the fat. And also, it's really just basic anatomy."

She calls out instructions, passing out latex gloves to others and asking students to fetch aluminum pans. Soon, the 70-minute class is over, and students are washing hands, grabbing backpacks, and headed off to subjects like math or English, while the next batch of students arrive to take over the next steps of processing. While memorable, it's not a particularly out-of-the-norm day at Maysville Jr./Sr. High School.





FASCINATION AND REVULSION

Ellis has been teaching agriculture classes in Maysville, a rural town of just over 1,000 in northwest Missouri, for 11 years. She grew up in the town and is also the FFA advisor. She remembers processing harvested deer when she went to Maysville High, but, together with Amy Kanak, who teaches family and consumer sciences (FACS), they're taking it a step further, bringing a true nose-to-tail operation to the school where there are multiple lessons involving animals that have been harvested through hunting, farming, or fishing.

"I've always done deer — we did it whenever I was in high school here, and I thought it was really cool," says Ellis. "I just think it's good for these kids to see it. A lot of it is because

it's a rural community, but there's just so many kids that either like to go hunting or need the meat. There's a lot of families that honestly do rely on deer meat to get them through the winter."

On this particular November day, two does that were harvested before school by senior Garrett Bray provide multiple lessons across the school. After the initial processing by the freshman agriculture class, a student delivers some of the does' organs to an eighth grade science class. The middle schoolers gather around as their teacher, Cindy Eggleston, points out parts of the heart and lungs. Again, the students' faces reflect a mixture of fascination and revulsion. Some happily pull on their gloves and dig in, reveling in the hands-on learning. Others stand back, overwhelmed by the smell and covering their noses.





CLEAN PLATES

As the day goes on, Ellis' agriculture classes cycle through, passing the baton on the processing. Eventually, the meat ends up in Kanak's family and consumer sciences classroom, where the foods classes continue butchering and eventually cooking with the deer meat. Today, it's country fried deer steak with green beans, scalloped potatoes, and gravy.

"They lick these plates clean," Kanak says. "There's never a scrap left and there's people waiting at the door for it."

Kanak's day can begin with talking to students about childbirth and end with carving into a deer roast. It's truly full circle.

"It's life skills," she says. "It's super important and the kids look forward to it. You have to have math, you have to be able to read, but you also have to be able to do laundry and plan and budget and cook safely and take care of your children."

Kanak has even fielded phone calls outside of school hours from students who have gone fishing and need help being walked through the fileting process. The teachers at Maysville have taken the deer processing they remember doing as students themselves and drawn more lessons out of the wildlife, creating cross-curriculum lessons that range from anatomy to math to economics.

"I just knew there were ways that we could take this all the way," explains Kanak. "That's what we should be doing. We should be working together every opportunity we have."

While not every student will take these lessons into their careers, every student will use these lessons in their home when they're feeding themselves or their family.



MEAT-BASED LESSONS

STEM (a focus on science, technology, engineering, and math) is a mission in many schools, but Maysville is putting its own nature-based spin on the subject. Additionally, the agriculture and hunting-based lessons are deeply rooted in the town's rural location.

"Some of these kids will never have anything to do with ag as a job and that's fine," says Ellis. "But they're still going to be a consumer, you know, and that's why I like the processing stuff so much because it doesn't matter if we process deer, or if we process pork or chickens or lamb or whatever, they're still going to go to the store and see it. And then in 15 years, they'll go to the store and still remember where that came from."

Ellis and Kanak understand the importance of these lessons from a consumer standpoint. While not every student will take these lessons into their careers, every student will use these lessons in their home when they're feeding themselves or their family.

"One of my favorite units to do is any sort of meat unit because then they actually pay attention to stuff when they are buying it," says Ellis. "A lot of kids are surprised at the taste — to see it, touch it, smell it, taste it."



Maysville is especially resourceful about these meat-based lessons. They use community ties to create these experiences for these students. Sometimes, students farm, hunt, or fish the wildlife that are part of the lessons here, but sometimes, community members bring in deer to be processed, whether they need assistance having the animals butchered or enjoy hunting as a sport and want to donate the animal to the school for education. Ellis and Kanak also apply for grants to help with this curriculum.

"I'm surprised that more people don't do it," Ellis says of other teachers incorporating hunting into the classroom. "I mean, somebody else shoots. Whether the kid shoots the deer or somebody else shoots the deer, it's free. Meat is expensive at the grocery store and everybody's on a budget. All education is on a budget. I don't know why you wouldn't do these things. You can get it for free and give them an experience. I think it's good, especially in rural America. There's no reason why you shouldn't be doing some form of wildlife. I've actually mentored some ag teachers that are younger than me and I've convinced them to try it."

As teachers in a rural town, the faculty at Maysville know their school is the cornerstone of the community. Many rural places lack spaces to gather or feel that togetherness, but schools are a common place to rally around — a representation of the community's



values. As a Maysville native, Ellis takes this personally.

"The school is the heart of the town and without it, the town's gonna die," she says. "We've seen that over and over and over again, so I've said this to multiple people in my community — the school's got to be on the same page, or it's just bad for everybody."

FREE EXPERIENCES

On a perfect spring day in May, Ellis takes an eighth-grade class on a field trip to Smithville Lake about an hour south of Maysville. The students spend the day canoeing and fishing with the assistance of MDC agents. It is one of those days where the kids are having an amazing time, jumping into the lake from their canoes, their hair damp from swimming, bare feet caked in mud, and not a cell phone in sight.

Though the MDC agents catch a few fish to show off to the kids, none of the students have reeled in anything on their own lines yet until the last few minutes of the day. The teenagers all clamor around the successful angler, and Ellis comes over to see, grabbing a filet knife to show the kids how to properly process the fish.

After giving verbal instructions, she hands the knife over to the students as they take turns trying to deftly slice through the scales and get a clean filet. As always in her classroom during these lessons, there



are squeals of delight and disgust but always rapt attention.

"I loved high school, but I don't remember every single day what I did in each class," she says. "I remember the big things, you know. I remember cutting up deer. I remember welding for the first time. I remember doing skits for certain classes. It's those experiences that kids will remember — it's not the, 'here's a worksheet' or 'watch this video.' So, I like experiences — especially if they're free."

As the students trudge back to the bus with their fishing poles and half-dried clothing after fileting the fish, one of the students bounces over to Ellis.

"Thanks for teaching me that!" she says excitedly.

It's about the best day you can hope for — whether you're a teacher or a student. ▲

Katie Currid is a freelance photojournalist who lives in Weston with her husband and three children. She loves exploring Missouri's many outdoor spaces and learning to identify plants and wildlife with her family.

DARK

**THOUSAND HILLS
STATE PARK**

Photograph Courtesy of Missouri
Department of Natural Resources

SKIES

A full-page background image showing a night sky with the Milky Way galaxy visible, reflected in a body of water. The sky is dark blue and black, filled with stars and the bright, hazy band of the Milky Way. The water in the foreground is calm, creating a clear reflection of the sky above. The horizon line is visible in the lower third of the image, with some dark silhouettes of trees or land.

PRESERVING
THE
NIGHTTIME
DARKNESS
FOR THE
HEALTH OF
WILDLIFE

**by DeAnn Gregory
and Vayujeet Gokhale**



The night sky inspires a deep sense of wonder. Almost every known culture and civilization has stories, myths, rituals, and calendars based on events, stars, and constellations in the night sky. The night sky connects humanity over space and time. Our ancestors looked up at the majestic sky and wondered, “What is out there?” And we still do today. Astronomical events like meteor showers, eclipses, or seeing our home galaxy, the Milky Way, in a dark summer sky and viewing distant objects like our sister galaxy, Andromeda, from a telescope create excitement, thrills, and wonder for people of all ages. Darkness at night is a natural resource that can easily be preserved for the benefit of all.

Yet, our experience with darkness and our connection with the night is being lost. Electric lighting has transformed our outdoor spaces at night. As people spend more time indoors, we become oblivious to the nighttime environment. Despite this, we are overlighting the night, ostensibly for the sake of safety. Humans can get blackout curtains or move further away from this problem we created, but insects, birds, and wildlife do not have this luxury. The good news is that, by using light more responsibly, we can have all the benefits without disrupting the ecological balance.

SKY GLOW

Electrical outdoor lighting is not new. It has been around for just over 150 years. Astronomers were among the first to notice “sky glow” — the fog of light from towns and cities — interfering with their observations. With the transition to LED lighting in the past decade, the impacts of outdoor lighting have changed dramatically. Though if used properly, LEDs are more efficient and controllable. They are also generally broad-spectrum, often resulting in more light scattering further in the environment.





ALL LIVING THINGS NEED DARKNESS

It's easier to understand the effects of outdoor lighting at night on wildlife when you remember that human vision adapts instantaneously to daylight. In contrast, humans take 30 minutes to fully adapt to darkness. The amber/red hue of a campfire doesn't disrupt our night vision, but a flashlight can disable it for several minutes. Just as glare and overlighting at night causes human eyes to squint, dilating our pupils and forcing us to look away, it also affects nocturnal wildlife.

The vision of nocturnal animals and most insects is especially sensitive to artificial light. Artificial lighting can overwhelm them, causing impaired vision, temporary blindness, disorientation, and avoidance, and leading to reduced access to critical habitats or food sources.

A deer in the road may be in fright/freeze mode, but it's also temporarily blinded by the sudden appearance of headlights, unable to see the edge of the road to escape. We don't want this effect with outdoor lighting.

The adaptations of nocturnal wildlife are amazing, each highly specialized for success. For example:

- Bat echolocation calls can be as loud as a smoke alarm.
- Large ears of the red fox allow it to locate and ambush rodents.
- The asymmetrical position of ears of some owls allows them to triangulate the location of prey.
- Tapetum lucidum, reflective tissue in the eyes of some animals that increases available light, allows them to be successful in low-light conditions (white-tailed deer, Virginia opossum, cougar, raccoon, red fox, and many others).

If used irresponsibly and disrespectfully to the natural world, LED technology can have hidden costs and unintended consequences.

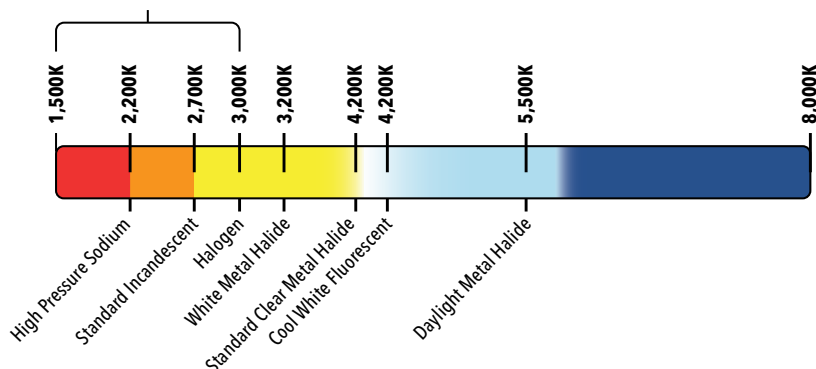
With LED technology, one can get the same or more amount of light or lumens from a lesser amount of electricity (wattage). Unfortunately, this efficiency comes at a price:

- The lower cost has led to overconsumption.
- Bright blue-white LEDs at night disrupt the circadian rhythm of living things.
- Increased light scattering means that even unlit areas of the countryside lose their view of the night sky, washing out truly magnificent sights.

Kelvin Temperature Chart

Eligible for DarkSky Approved Status

3,000 and lower (up to 3220K actual measured value)



Daytime "white light" corresponds to a correlated color temperature (CCT) of about 5,500 Kelvin as depicted above. Lighting technologies (some of them obsolete) are shown for comparison. LED lights can come in a range of CCTs, but LEDs with CCT less than 3000K are less destructive to nocturnal habitat.

NIGHT SKYLINE: DAN ZARLENGA; DEER & FIREFLY: NOPPADOL PAOTHONG



White-tailed deer

The predictable rhythms of light and darkness are encoded in the DNA of all plants and animals. Daily, lunar, and seasonal cycles have governed life processes across evolutionary history, including foraging, sleep, reproduction, predator-prey relationships, and migration. Every living thing has a kind of “master clock” tuned daily by natural light, regulating biological rhythms so that the right processes occur at the right time. Even niches created by moon cycles are essential to many species.

Just as light with shorter wavelengths (blue light) is essential in daytime, exposure to these same wavelengths at night can be injurious. Complex behaviors and life cycles of mammals, birds, fish, amphibians, insects, and plants can be disrupted by outdoor artificial lighting, with broad implications. For example, secretion of melatonin, which plays a role in cellular repair and other essential functions, even for insects, can be disrupted. Artificial light can be a barrier, fragmenting habitat, and it can be a trap. If it’s a barrier, the animal can turn around and go the other way. It survives, but its range, dispersal, reproduction, and other natural behaviors may be disrupted.

But lighting as a trap often causes death. North and eastern Missouri is within the largest migratory flyway in North America. Sky glow attracts migrating birds into towns and cities. Once entrapped in an alien environment, they become disoriented, circling to exhaustion. For billions of birds, this

spiral ends with mortality, colliding with a window or death by cat. Artificial light also interferes with a songbird’s ability to calibrate its internal compass. In response to these mortality events, dozens of cities have adopted voluntary “Lights Out” programs.

Even for resident songbirds, outdoor lighting can interfere with seasonal behaviors, potentially reducing food availability for raising young. Non-migratory birds and even hawks and owls also collide with glass due to multiple factors, including artificial light spilling from windows.

In 2007, two bat scientists were studying the feeding behavior of little brown bats (*Myotis lucifugus*) when they began hearing bats crashing into their study

trailer and nearby brush. They found their light was interfering with the bats’ navigational skills. Though some more common bat species, such as the eastern red bat, do feed on insects in illuminated areas, Missouri’s rare bat species tend to avoid lights and illuminated areas.

The economic and ecological benefits of crepuscular and nocturnal mammals as well as many birds and invertebrates are incalculable yet often overlooked. For example, the benefit of North American bats to agriculture is estimated in the tens of billions of dollars by controlling crop pests. Red foxes and coyotes prey on rodents at night while we sleep, providing a key ecosystem service for human health.



Little brown bat



Eastern screech-owl



Red fox

POLLINATORS AND INSECTS

Many nocturnal insects, including moths and certain beetles, use the moon and stars for navigation and orientation. Once attracted to artificial light at night, they may be temporarily dazzled, blinded, or trapped in the light and die. This is the vacuum cleaner effect — about a third of insects die within 24 hours of being attracted to light.

Diurnal insects and pollinators are also impacted. For example, monarch butterflies migrate during the day and rest at night. Artificial lighting interrupts this crucial rest period. Better lighting choices, even eliminating decorative lighting, can help mitigate these impacts.

Most firefly species cannot reproduce in the presence of artificial light. The knock-on effects are that rapidly declining insect populations affect other taxa that rely on them for food or pollination.



Luna moth



For more information about conserving darkness and using outdoor lighting responsibly, refer to the following resources:

Milky Way brochure:
short.mdc.mo.gov/49i

Missouri's Darkest Skies:
short.mdc.mo.gov/49S

Outdoor Lighting:
short.mdc.mo.gov/49q

Artificial Light at Night:
short.mdc.mo.gov/49p

Lights Out Heartland:
lightsoutheastland.org

FISH AND AQUATIC INSECTS

Aquatic ecosystems experience a wide range of natural illumination. Light penetration affects primary production and species distribution within each niche. Aquatic organisms are particularly sensitive to, and their life cycles may be disrupted by, artificial light above and cast into the water. Light at night can alter key behaviors such as schooling, feeding, and predator-prey interactions. The early life-cycle stages of mayflies, caddisflies, and other invertebrates are aquatic, creating a foundation of the food chain for many fish. Damselflies, dragonflies, aquatic beetles, and others feed on mosquito larvae both as nymphs and adults. In their short-lived adult stage, these insects require natural darkness for successful dispersal and reproduction.

Conserving darkness near water allows insects to complete their life cycles and benefits fish populations.

BETTER LIGHTING

Doing even small things to conserve natural darkness and watching out for nocturnal creatures can make a big difference. Here are a few things you can do to make a difference:

- Use light only when and where needed.
- Reduce light intensity by reducing lumen levels. Using lights that are no brighter than necessary will save money and reduce glare.
- Use lights with an amber or yellow tone, between 2200K and 2700K (Kelvin).
- Ensure that any new outdoor light fixture is fully shielded, so that all light is directed downward.
- Where possible, use motion sensors, timers, and dimmers to save money and reduce unintended impacts. ▲

DeAnn Gregory is retired from the Missouri Department of Natural Resources. A Missouri Master Naturalist and board member of DarkSky Missouri, she enjoys exploring Missouri outdoors with her husband.

Vayujeet Gokhale is a professor of physics and astronomy at Truman State University. He loves the night sky and America's national parks, and dreams of someday becoming an astronomy park ranger at Arches National Park in Utah.

Get Outside

in SEPTEMBER

➔ Ways to connect with nature

Poison Ivy Appreciation?

Poison ivy is one of those plants no one is happy to encounter. Usually seen as a creeping vine or low shrub, poison ivy contains an oil called urushiol, known to cause an allergic reaction, including rashes and blisters. However, in the fall, its leaves turn an amazing shade of red, and sometimes orange or yellow. It is a time to admire the poisonous plant — at a safe distance, of course.



What's That Sound?

Male **elk** begin bugling in the fall to attract a mate. It's a great time to see Missouri's elk herd at Peck Ranch Conservation Area. Take a self-guided driving tour, get a glimpse of an elk, and take in all the fall color.

What the Devil?

Hickory horned devils are the caterpillars of the regal moth, also known as the royal walnut moth. Most people see these huge, colorful, horned larvae in late summer and early fall as they search for a place to dig into the soil. Despite their menacing appearance, they are not venomous. In fact, their horns are flexible, not sharp or stinging.



Unusual Acorn

Acorns fall this time of year and serve as an important food for wildlife. Did you know Missouri is home to 22 species of oak? One of those oaks — **the bur oak** — produces an unusual looking acorn. It is fringed or hairy. This is our only native oak to develop acorns with such an unusual, fringed border along the cup.



Natural Events to See This Month

Here's what's going on in the natural world.



Tree swallows migrate south.



Native goldenrods bloom.



Crayfish mate.

VIRTUAL

LEARN TO FISH: Virtual Fly Tying with T.J. and Mike

Thursday • Sept. 18 • 6-7 p.m.
Online only
Registration required by Sept.
17. For more information, call
888-283-0364 or visit
short.mdc.mo.gov/4Fp.
All ages

Come and tie flies with
T.J. and Mike. The theme
is upland game bird
and turkey. Learn to
preserve self-harvested
bird feathers and how
to incorporate them
into your home tying.

VIRTUAL HUNTING SERIES: Firearms Deer Hunting

Thursday • Sept. 25
5:30-6:30 p.m.
Online only
Registration required by Sept.
24. For more information, call
888-283-0364 or visit
short.mdc.mo.gov/4FG.
All ages

Ready to try deer hunting?
This program will teach
the basics of deer
hunting, including what
to wear, how to scout for
deer, hunting methods,
safety, and regulations.

An Unusual Visitor

If you're a fan of birds, you
won't want to miss out on this
opportunity. **American white
pelicans** congregate at wetlands
from late September through
mid-October as they
migrate south. It is
a great time to get
out and catch a
glimpse of these
immense birds.



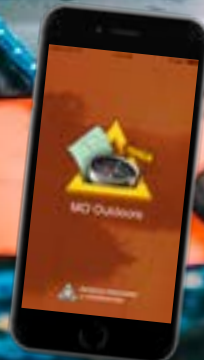
Opossum
young are
weaned.



Lined
snakes
mate.

EXPLORE MISSOURI

DISCOVER
NATURE
ANYWHERE



Places to Go

CENTRAL REGION

Diana Bend Conservation Area

A river, two creeks,
and an overlook

by Larry Archer

✳ Located on 1,343 acres in Howard County, Diana Bend Conservation Area is bordered by the Missouri River to the south, Moniteau Creek to the east, and Katy Trail State Park to the north. With Salt Creek cutting the area in half from north to south, the area offers significant opportunities for viewing shorebirds and other water birds if the weather cooperates.

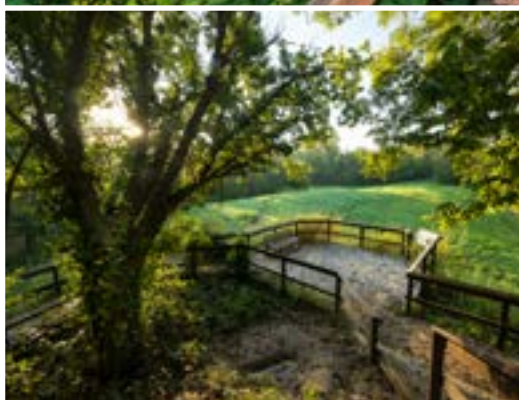
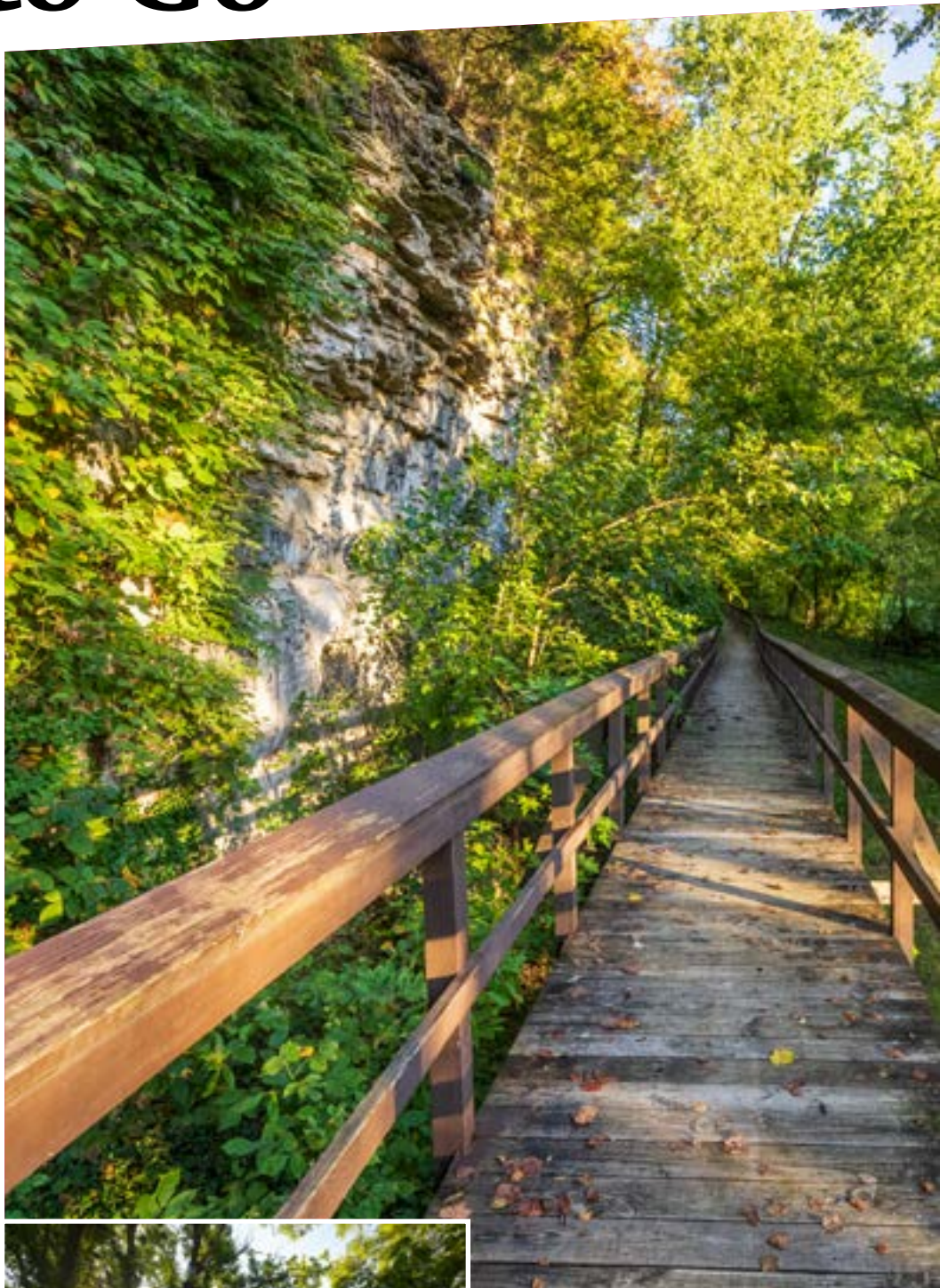
"It's popular with birdwatchers this time of year if we have water," said Wildlife Biologist Steven Noll. "We're dependent upon a high river, high creek, or the levee district pumping our direction."

And while most of the area is lowland flood plains, it also offers an overlook with impressive views of the river, sunsets, and the occasional wedding, Noll said.

"It's a very steep trail to get up to the overlook, but due to the proximity to the Katy Trail, it's pretty popular," Noll said. "It gives a commanding view of the flood plain there."

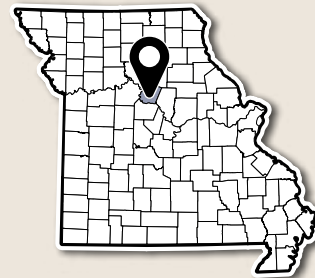
However, the view comes at a price, he said.

"I used to call it the American quit smoking trail, because it's quite high, and it's very steep, but the view is worth the effort," he said.



"Most of the trees flooded and tipped over back in 2011 when the river was high all summer. We lost most of our trees, so it's mostly early successional wetland type habitat."

—Wildlife Biologist Steven Noll



DIANA BEND CONSERVATION AREA

consists of 1,343 acres in Howard County. From Columbia, travel west on I-70 and take the Midway Exit onto Highway 40. Drive 11 miles to the welcome sign on the left. The area, which is adjacent to the Missouri River, is slightly more than one-half mile down a gravel road.

38.9916, -92.6197

short.mdc.mo.gov/4F9 573-815-7900

WHAT TO DO WHEN YOU VISIT



Bicycling Includes 12 miles of improved and service roads open to bicycling year-round.



Birdwatching Included in the National Audubon Society's Manitous Floodplain Important Bird Area (short.mdc.mo.gov/4FH). The eBird list of birds recorded at Diana Bend CA is available at short.mdc.mo.gov/4FV.



Camping Designated camping sites available. Boat-in camping along Missouri River allowed.



Fishing Catfish, crappie, sunfish, and white bass



Hiking Service roads, mostly atop levees, gives hikers 12 miles of access to the area.



Hunting Deer and turkey
Regulations are subject to annual changes. Refer to MDC's regulation page online at short.mdc.mo.gov/Zjw.

Also **dove, quail, and rabbit.**



Trapping Special use permit required.



Waterfowl Hunting Open hunting. Waterfowl regulations are subject to annual change, so check the *Migratory Bird and Waterfowl Hunting Digest 2025–2026* for current regulations.

WHAT TO LOOK FOR WHEN YOU VISIT



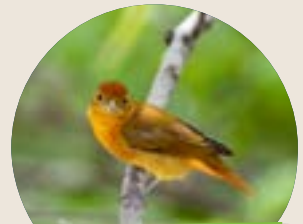
False map turtle



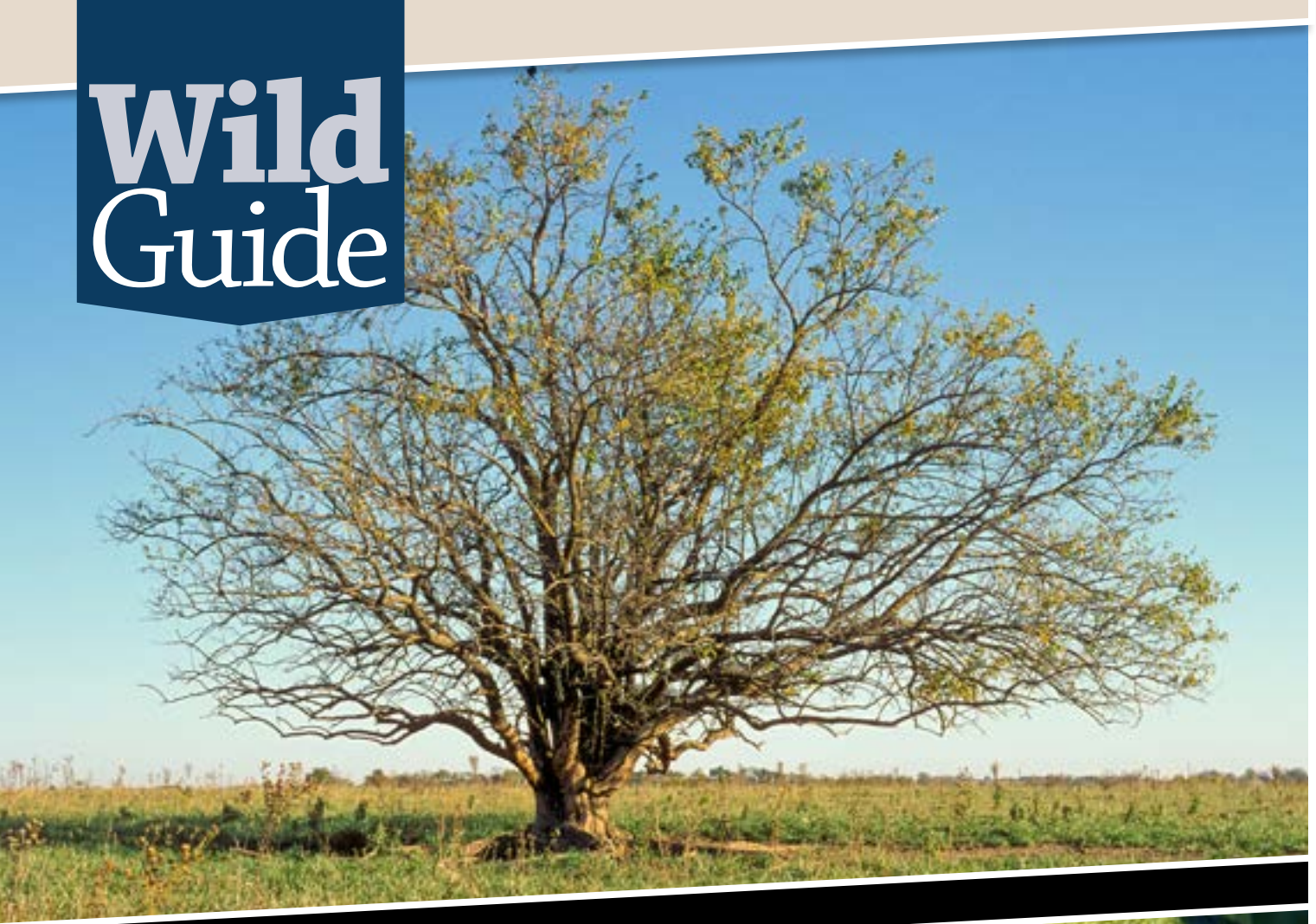
Eastern hog-nosed snake



Northern harrier



Summer tanager



Osage Orange

Maclura pomifera

Status

Native

Size

Height: to 50 feet

Distribution

Statewide



Osage orange is a medium-sized tree with a short trunk and dense, round or irregular crown.

Once used as a hedgerow and windbreak, it was often referred to as hedge apple. The large, yellowish-green fruits, measuring 4-5 inches across, appear from September through October. The surface of the fruit is bumpy, resembling a brain, and the inside is embedded with seeds.



LIFE CYCLE

The wood from an Osage orange is heavy, uniquely yellow-orange, and resists decay. Osage Indians used it to make bows, perhaps contributing to its other names, bois d'arc and bow-wood. Settlers planted rows of Osage orange as a living cattle fence.



ECOSYSTEM CONNECTIONS

Squirrels tear apart the fruit to eat the seeds, and in open areas, the tree provides invaluable cover to many small mammals and birds. It can become a nuisance in prairies and savannas and invades forest communities, especially after disturbances such as grazing.

Outdoor Calendar

❖ MISSOURI DEPARTMENT OF CONSERVATION ❖

Free MO Hunting and MO Fishing Apps

MO Hunting makes it easy to view permits, electronically notch them, and Telecheck your harvest. MO Fishing lets you view permits, find great places to fish, and ID your catch. Get both in Android or iPhone platforms at short.mdc.mo.gov/Zi2.



FISHING

Black Bass

Impounded waters and non-Ozark streams:
Open all year

Most streams south of the Missouri River:

- ▶ Catch-and-Keep:
May 24, 2025–Feb. 28, 2026

Bullfrog, Green Frog

June 30 at sunset–Oct. 31, 2025

Nongame Fish Giggling

Impounded waters, sunrise to sunset:
Feb. 16–Sept. 14, 2025

Streams and impounded waters,
sunrise to midnight:
Sept. 15, 2025–Feb. 15, 2026

Paddlefish

On the Mississippi River:
Sept. 15–Dec. 15, 2025

Trout Parks

State trout parks are open seven days a week
March 1 through Oct. 31.

Catch-and-Keep:
March 1–Oct. 31, 2025

Catch-and-Release:
Nov. 14, 2025–Feb. 9, 2026

HUNTING

Black Bear*

Oct. 18–31, 2025

Bullfrog, Green Frog

June 30 at sunset–Oct. 31, 2025

Coyote

Restrictions apply during April, spring turkey season, and firearms deer season.

Open all year

Crows

Nov. 1, 2025–March 3, 2026

Deer

Archery:

Sept. 15–Nov. 14, 2025

Nov. 26, 2025–Jan. 15, 2026

Firearms:

- ▶ Early Antlerless Portion (open areas only):
Oct. 10–12, 2025
- ▶ Early Youth Portion (ages 6–15):
Nov. 1–2, 2025
- ▶ November Portion:
Nov. 15–25, 2025
- ▶ CWD Portion (open areas only):
Nov. 26–30, 2025
- ▶ Late Youth Portion (ages 6–15):
Nov. 28–30, 2025
- ▶ Late Antlerless Portion (open areas only):
Dec. 6–14, 2025
- ▶ Alternative Methods Portion:
Dec. 27, 2025–Jan. 6, 2026

Doves

Sept. 1–Nov. 29, 2025

Elk*

Archery:

Oct. 18–26, 2025

Firearms:

Dec. 13–21, 2025

Groundhog (Woodchuck)

May 12–Dec. 15, 2025

Opossum, Raccoon, Striped Skunk

Aug. 1–Oct. 15, 2025

Pheasant

Youth (ages 6–15):

Oct. 25–26, 2025

Regular:

Nov. 1, 2025–Jan. 15, 2026



Quail

Youth (ages 6–15):

Oct. 25–26, 2025

Regular:

Nov. 1, 2025–Jan. 15, 2026

Rabbits

Oct. 1, 2025–Feb. 15, 2026

Sora, Virginia Rail

Sept. 1–Nov. 9, 2025

Squirrels

May 24, 2025–Feb. 15, 2026

Teal

Sept. 13–21, 2025

Turkey

Archery Portion:

Sept. 15–Nov. 14, 2025

Nov. 26, 2025–Jan. 15, 2026

Firearms Portion:

Oct. 1–31, 2025

Waterfowl

See the Migratory Bird and Waterfowl
Hunting Digest or visit short.mdc.mo.gov/ZZx
for more information.

Wilson's (Common) Snipe

Sept. 1–Dec. 16, 2025

Woodcock

Oct. 18–Dec. 1, 2025

TRAPPING

Opossum, Raccoon, Striped Skunk

Only foot-enclosing traps and
cage-type traps may be used.

Aug. 1–Oct. 15, 2025

**Only hunters selected through a random drawing
may participate in these hunting seasons.*

For complete information about seasons, limits,
methods, and restrictions, consult the *Wildlife
Code of Missouri* at short.mdc.mo.gov/Zib.

Current hunting, trapping, and fishing regulation
booklets are available from local permit vendors
or online at short.mdc.mo.gov/ZZf.



Serving nature and you[®]



**Follow us
on Instagram**

@moconservation

During the month of September, you may spot monarch caterpillars feeding on milkweed. They are preparing for their final stage of development and eventual migration south where they will overwinter. Fall is the perfect time to explore Missouri's outdoors. What will you discover?

📷 by **Noppadol Paothong**

Free to Missouri households

To subscribe, cancel your subscription, or update your address, visit mdc.mo.gov/conmag.